

NON-MARINE MOLLUSCA FROM THE FLORIDA ISLANDS, SOLOMON ISLANDS

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ABSTRACT.

Land and freshwater molluscs collected on Florida and Tulagi Islands by Robert E. Kuntz in 1943-1945 are reviewed. New species are *Mocella kuntzi*, *Orpiella kuntzi*, *Palaina floridana*, *Palaina clappi*, and *Palaina megamorphia*. Several other species are reported from the Solomons for the first time.

INTRODUCTION.

Very little is known of the Solomon Island molluscan fauna. Clench (1941: 1-3) summarized the history of early collecting, and references to studies on the marine molluscs can be found in Solem (1953, 1958). Papers on the non-marine fauna are few, those of Smith (1885), Clapp (1923), I. and B. Rensch (1935, 1936), Clench (1951, 1958) and Dell (1955a, 1955c) providing the only data other than scattered species descriptions. Most of these papers cover general collections, the only islands specifically considered being Nissan (Dell, 1955a), the Treasury Group (Dell, 1955c), and Rennell Island (Clench, 1958).

Robert E. Kuntz was stationed on Florida Island from 1943 to 1945. He collected molluscs from sixty localities on Florida and Tulagi Islands (identified by the FLW and ML numbers in the text). A map showing the exact location of each site is on file in the Mollusk Division of the University of Michigan Museum of Zoology. Some stations were in brackish water or marine habitats, and reference to these may be found in Solem (1958).

Prior to Kuntz's work, only eleven species were recorded from Florida Island and three from nearby Tulagi. Kuntz collected thirty-two different molluscs on Florida Island and eight on Tulagi. Five species are new to science, and several genera of minute snails were previously unreported from the Solomons. This reflects the fact that, except for R. K. Dell, no malacologist has collected in the Solomons. Most material has been brought back by missionaries, traders, planters, or vertebrate zoologists who collect only the large, spectacular *Placostylus*, *Papuina*, and *Chloritis*, and ignore the rich fauna of minute species.

Kuntz made even larger collections in the New Hebrides, which were studied at the same time, and are reported on elsewhere (Solem, 1959a, 1959b). Most of his material is deposited at the University of Michigan Museum of Zoology, with some duplicate sets in the Chicago Natural History Museum.

Specimens from several institutions were studied in comparison with Florida Island material. For convenience, the following abbreviations identify the location of material referred to in the text:—

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AMNH	American Museum of Natural History.
ANSP	Academy of Natural Sciences, Philadelphia.
BPBM	Bernice P. Bishop Museum, Honolulu.
CM	Carnegie Museum, Pittsburgh.
CNHM	Chicago Natural History Museum.
MCZ	Museum of Comparative Zoology, Harvard.
UMMZ	University of Michigan Museum of Zoology.

Available data concerning the FLW and ML sites referred to below and in Solem (1958) are given in the appendix. (See p. 53.)

SYSTEMATIC REVIEW.

Family Pupillidae.

Gastrocopta (Sinallbinula) pediculus (Shuttleworth, 1852).

FLW 38, FLW 40.

Family Tornatellinidae.

Lamellidea pusilla (Gould, 1847).

FLW 40.

Identified by Dr. Yoshio Kondo. Possibly *L. solomonensis* Dell (1955b) is a synonym of the widely distributed *L. pusilla*.

Family Partulidae.

There is insufficient material in museum collections to evaluate the specific status of the many named Solomon Island *Partula*. They present a uniform appearance of shells 16-17 mm. high, light greenish-horn in colour (sometimes with white bands), and very prominent spiral sculpture. Specimens from the Bismarcks, Admiralties, and Louisiades are very similar to those from the Solomons. The status of the "*Partula*" reported from Western New Guinea is uncertain. The early species named by Lesson have not been rediscovered, while Iredale (1941: 64) created the genera *Scilistylus* and *Amimopina* for other species. *Scilistylus* remains enigmatic, but *Amimopina* is probably an enid. (See Solem, 1959c).

The New Hebridean partulids are usually associated with those from northern Melanesia. The former are quite different, being more than 20 mm. high, with a more elongate spire, much weaker spiral sculpture, and with longitudinal brown streaks on a lighter background. Two New Hebridean species resemble the Solomon Island type (see Solem, 1959b: 71-73), but the others are readily distinguishable.

One Florida Island specimen was identified through comparisons with Hartman's types in the CM.

Partula coxi Hartman, 1886.

Partula coxi "Angas" Cox, 1868, Exchange List, p. 46, No. 152 (Ysabel Island) (*nomen nudum*); Hartman, 1886, *Proc. Acad. nat. Sci. Philad.*, 1886: 32, pl. 2, fig. 7 (Ysabel Island); Pilsbry, 1909, *Man. Conch.*, (2), 20: 296-297, pl. 36, figs. 1-4.
FLW 37.

The shell appears inseparable from the holotype of *Partula coxi*, and differs only slightly from *Partula pellucida* (Pease). Possibly both named forms were collected from Ysabel Island, the cited type localities of Hartman often being in error (see Solem, 1959b: 72). Dell (1955c:

428) reported a shell from Mono Island (Treasury Group) which may be the same species as the Florida shell.

Family Endodontidae.

The Solomon Island species include the large, scalariform endemic genus *Foxidonta* (Clench, 1950), and several quite minute species which have been referred to several different genera. *Endodonta solomonensis* Clapp, *Gyropena nissani* Dell, and a new species are discussed below. Clench (1958: 173-174) recently described two "*Charopa*" from Rennell Island. These species are probably not congeneric with the New Zealand *Charopa*, and may not be endodontids, but rather aberrant paryphantids. The information needed to determine their generic position was not given in the original description, and may be obtainable only from dissection of the soft parts.

Stenopylis coarctata (Moellendorff) was discussed fully by Solem (1957). It has an amazingly wide distribution, ranging from Central Australia, the Solomons and New Guinea to the Philippines and Java.

Mocella solomonensis (Clapp, 1923). (Plate 4, figs. 1-5).

Endodonta (Charopa) solomonensis Clapp, 1923, *Bull. Mus. comp. Zool., Harv.*, 65: 378, figs. 21-24 (Ugi, Solomon Islands).

Holotype from Ugi, Solomon Islands.

The only known specimen is rather worn, but traces remain of the apical sculpture (Fig. 4), and show that this species belongs to the *Mocella* complex. The original illustrations are not fully satisfactory, and the species has been refigured here, including a greatly enlarged drawing of microsculpture between the major radial ribs (Fig. 5).

Generic placement of the Pacific endodontids is difficult. A wide ranging group of toothless shells has the same spiral apical sculpture and microsculpture between the ribbing. Many generic names have been applied to this complex, which is found in Polynesia, Melanesia, New Zealand, Australia, and Lord Howe Island. The earliest appears to be *Mocella*, and, until finer distinctions can be made, I'm utilizing this name for the entire series (see Solem, 1959b: 83). The three species discussed here, *solomonensis*, *nissani*, and *kuntzi*, are referred to *Mocella*.

Mocella kuntzi sp. nov. (Plate 5, A, figs. 1-3).

Diagnosis: A species of *Mocella* separated from *M. solomonensis* by its smaller size (2.0 against 2.8 mm.), more crowded sculpture, and slower rate of whorl increment; from *M. nissani* by its narrower umbilicus and slightly higher shell.

Description: Shell minute, depressed-helicoid, spire only slightly elevated. Whorls $3\frac{1}{4}$ to $3\frac{3}{4}$, very slowly increasing in size. Sutures moderately impressed, whorls convex. Aperture ovate, strongly compressed above. Umbilicus deep, open, contained about four times in the diameter. Apical whorls $1\frac{1}{2}$, finely spirally ribbed. Spire and body whorl with strong radial ribs (68 on whorls 2-3; 104 on whorls 3-4). Microsculpture of fine riblets crossed by spiral lines between the primary ribs. Colour reddish-brown. Diameter, 1.9-2 mm., height 1.0-1.3 mm.

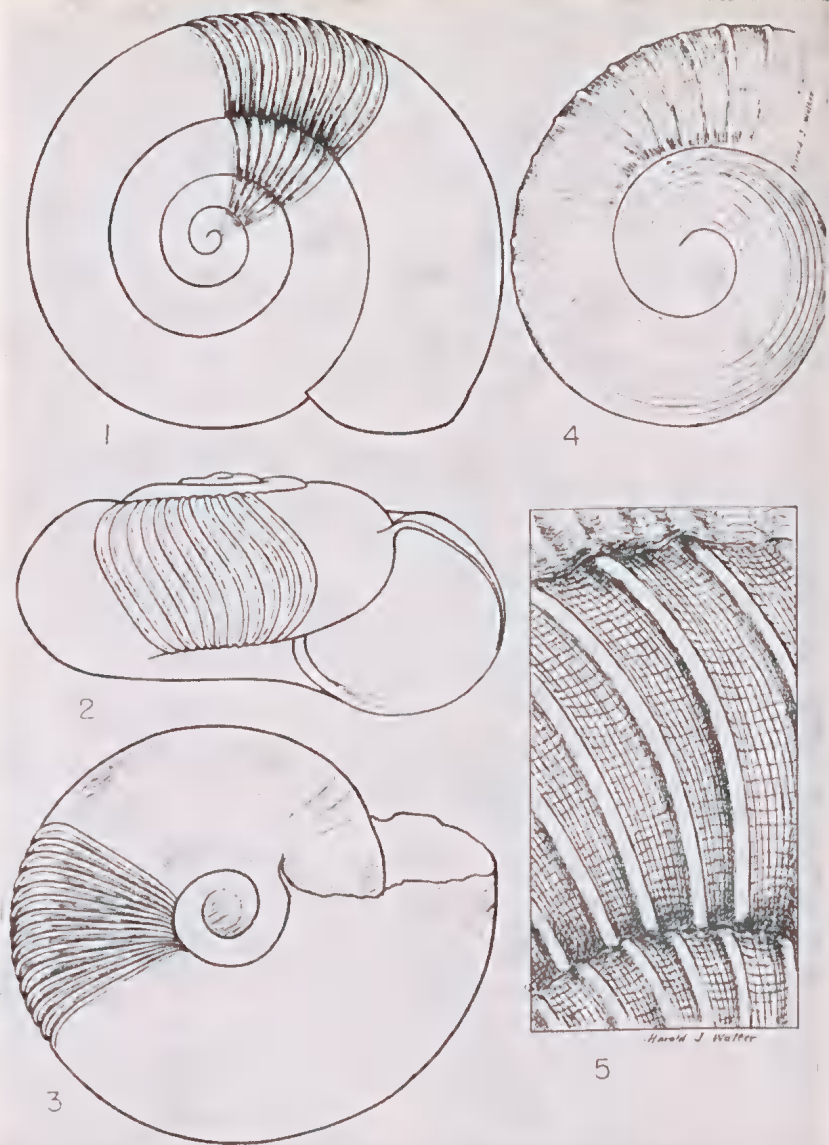


PLATE 4.

Mocella solomonensis (Clapp). Holotype.

Fig. 1 Top view.

Fig. 2. Side view.

Fig. 3. Bottom view.

Fig. 4. Apical sculpture.

Fig. 5. Microsculpture between radial ribs.

Type Locality: Peninsula east of Halavo, Florida Island, Solomon Islands (FLW 38). In leaf mould. November, 1944.

Types: The holotype is University of Michigan Museum of Zoology No. 186035. Paratypes from FLW 38 and FLW 40 are UMMZ 186034, MCZ 186827, and CNHM 54905.

Remarks: *Mocella kuntzi* is most closely related to *M. nissani* (Dell, 1955a: 328, figs. le-g), but differs in umbilical size. They may be only subspecifically distinct, but at present may best be considered full species. The variation in two lots of *M. kuntzi* is summarized in Table 1.

Table 1.

Mocella kuntzi.

	FLW 38 (UMMZ 186034)		FLW 40 (UMMZ 186035)	
	Mean	Range	Mean	Range
Diameter	2.07	1.90-2.23	2.07	1.94-2.23
Height	1.16	1.10-1.29	1.11	1.03-1.16
H/D ratio	0.56	0.53-0.61	0.54	0.49-0.56
Whorls	3 $\frac{11}{16}$	3 $\frac{1}{2}$ -3 $\frac{3}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$ -3 $\frac{3}{4}$
Umbilicus	0.50	0.45-0.54	0.53	0.48-0.64
D/U ratio	4.15	3.84-4.28	3.93	3.46-4.34

All measurements in mm.

Stenopylis coarctata (Moellendorff, 1894).

FLW 38, FLW 40.

Family Helicarionidae.

Liardetia (*Liardetia*) *samoensis* (Mousson, 1865).

FLW 38.

Ranges from the Bismarcks and New Caledonia east to the Marquesas.

Liardetia (*Liardetia*) *nissani* (Dell, 1955).

Orpiella (*Owaraha*) *nissani*, Dell, 1955, *Pacific Sci.*, 9: 326-327, figs. la-c (Tangalan Plantation, Nissan Island, Solomon Islands).

Through the kindness of Dr. Yoshio Kondo, it was possible to examine a paratype (BPBM 212366). Apparently this species is very closely related to *L. samoensis*, differing only in having less prominent radial sculpture, more crowded spiral sculpture on the base, a slightly slower rate of whorl increment, and a more depressed shape. The differences are all of degree, the sculptural details and general aspect of *nissani* being very similar to *samoensis*. The sculpture and other shell features resemble much more closely *Liardetia* than any *Orpiella*. Pending study of the soft parts, I'm tentatively transferring *nissani* to *Liardetia*.

Wilhelminaia mathildae Preston, 1913.

FLW 38, FLW 40.

The same species is found in the New Hebrides (Solem, 1959b: 92-94), and probably ranges through Indonesia.

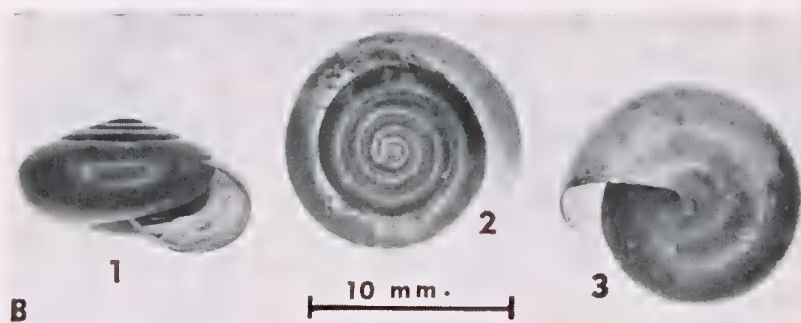


PLATE 5.

A. *Mocella kuntzi* sp. nov. Holotype.

Fig. 1. Bottom view. Fig. 2. Top view. Fig. 3. Side View.

B. *Orpiella kuntzi* sp. nov. Holotype.

Fig. 1. Side view. Fig. 2. Top view. Fig. 3. Bottom view.

Orpiella kuntzi sp. nov. (Plate 5, B, figs. 1-3).

Diagnosis: A species of *Orpiella*, the same size as *O. malaitensis* (Clapp) and *O. treasuryensis* (Tryon), which differs from the former by its less open umbilicus, more reflexed columella, lower spire and more angulated periphery, and from the latter by its much lower spire, greater number of whorls and more angulated periphery.

Description: Shell solid, slightly elevated, shining, with faint radiating lines at regular intervals. Whorls $5\frac{1}{2}$ to 5%, regularly increasing in size, sutures slightly impressed, whorls of spire gently rounded, body whorl obliquely angulated above the middle of the whorl, flatter above the angulation, more rounded below. Aperture ovate, slightly compressed laterally, lip slightly thickened. Umbilicus closed apically, but with an umbilical chink partially covered by a reflection of the columellar lip. Parietal callus thin and somewhat opaque. Diameter 13.0-14.0 mm., height 6.8-7.5 mm.

Type Locality: One mile in jungle behind Halavo, Florida Island, Solomon Islands at 200 feet elevation (FLW 15). Robert E. Kuntz, collector. October 1, 1944.

Types: The holotype is University of Michigan Museum of Zoology No. 184473. Paratypes are UMMZ 184474 (FLW 15) and UMMZ 184475 (FLW 4).

Remarks: *O. kuntzi* is perhaps most similar to *O. malaitensis*, but comparison with the holotype of the latter (MCZ 32553) showed the differences mentioned in the diagnosis. References to the previously described Solomon Island *Orpiella* can be found in Clapp (1923: 355-361) and I. and B. Rensch (1936: 654-659).

Dendrotrochus (*Dendrotrochus*) *cleryi cleryi* (Recluz, 1851).

FLW 42, FLW 52.

The shells are the same morph that H. B. Baker (1941: 256-257) reported from Three Sisters Island (ANSP 151452). Although Clapp (1923), I. Rensch (1934), Dell (1955c), and Clench (1958) reviewed the Solomon Island *Dendrotrochus*, their taxonomy is still unsettled. Both ecological and anatomical studies are needed before speciation patterns can be discerned.

Family Zonitidae.

Trochomorpha (*Lentitrochus*) *xiphias floridensis* Clapp, 1923.

Trochomorpha floridensis Clapp, 1923, *Bull. Mus. comp. Zool., Harv.*, 65 (11), p. 367 (Florida Island, Solomon Islands).

FLW 4, FLW 15, FLW 21, FLW 23, FLW 24, FLW 26, FLW 29, FLW 30, FLW 32, FLW 35, FLW 52.

T. x. floridensis has a higher, more convex spire and a less convex, less inflated base than *T. x. xiphias*. Other material examined from Tulagi (AMNH 70778) and Ysabel Island (MCZ 32518) does not differ significantly from the types (MCZ 32516, MCZ 73674). On Florida Island itself there is considerable variation.

Behind Halavo a peak rises from sea level to 1010 feet. Collections of *T. x. floridensis* from sea level to 500 feet showed a clinal variation in colour pattern, size and whorl count. No collections were made above

500 feet, and the variation from there to the summit remains to be investigated.

Specimens matching the types came from stations 21, 26, 35 and 52. The altitude of FLW 26 is unknown, but the other three lie between three and sixty feet above sea level. The shells are large (average diameter 15.2 mm., range 13.7-17.3, with 5% whorl average). They have a light background colour, two or three narrow spiral red bands above and two below the periphery. The bands are all narrower than their interstices.

Stations 29 and 30 were at about 100 feet elevation. The shells are smaller (average diameter 13.3 mm., range 13.0-13.8, with a 5 whorl average), with a darker background colour, and less prominent red bands which are wider than their interstices.

Shells from stations 4, 15, 21, and 24 were still smaller (station 24, for example, 13 shells average diameter 11.8 mm., range 10.4-12.9, with a 4% average whorl count). FLW 21 was bleached stream drift, but the other stations were 200 to 500 feet in elevation. The shells had a very dark background colour and only faint traces of very wide colour bands.

Material from FLW 23 and FLW 32 was juvenile. The probable cause of this variation is unknown. The genital anatomy of material from FLW 52 differed from that of *T. sanctaeannae* in having the vagina shorter and the talon smaller and less clearly bifurcate. The epiphallus is not sharply separated from the penis, but there is a zone of transition from the narrow pilasters of the epiphallus to the broader ones of the penis. One specimen yielded a small, flat, oval spermatophore.

Family Subulinidae.

Subulina (*Subulina*) *octona* (Bruguiere, 1792).

FLW 16, FLW 42, FLW 43.

Lamellaxis (*Allopeas*) *gracilis* (Hutton, 1834).

FLW 38, FLW 40, FLW 42, FLW 43.

Family Streptaxidae.

Gulella (*Huttonella*) *bicolor* (Hutton, 1834).

FLW 16, FLW 32, FLW 33.

A species widely disseminated by commerce.

Family Bulimulidae.

Placostylus (*Placocharis*) *kreftii* (Cox, 1872).

FLW 4, FLW 15, FLW 24, FLW 43.

Forty-five specimens of *P. kreftii* were examined. Size and shape varied considerably (see Table 2), encompassing the slender form *artus* and relatively obese shells. The parietal tooth was well developed in most specimens, but was greatly reduced or absent in about one-fourth of the shells.

The relationships of *P. kreftii* are uncertain. Clench (1941) associated it with *P. cleryi* (Petit) in *Eumecostylus*, while others place it with *P. palmarum* (Mousson) and *P. macgillivrayi* (Pfeiffer) in *Placocharis*. The two subgenera are only weakly characterized and they may eventually be combined.

Family Camaenidae.

Australian workers divide this into a number of families, generally based on shell structure. The Australian genera are no more diverse than the West Indian taxa studied by Wurtz (1955). My own dissections of Pacific species and the anatomical data in the literature provide no criteria justifying family separation of the Pacific and West Indian genera, much less recognition of separate family groupings in the Australian region.

Eustomopsis customus (Pfeiffer, 1857).

FLW 4.

Chloritis quercina (Pfeiffer, 1857).

FLW 2, FLW 4, FLW 42, FLW 52.

The twenty-five specimens collected by Kuntz belong to the variety *hombroni*. Some populations of this species show intergrades between typical *quercina* and *hombroni* (see Clench, 1958: 197-198), but the Florida Island populations sampled show little variation (Table 2). Typical *quercina* has a H/D ratio of 75-80, while the Florida population averages 61.5.

Clench (1958:198) described *Eustomopsis renschi* from Tulagi Island. It was not collected by Kuntz, but from available data seems to be only an extreme variation of the *quercina* complex. Possibly it is only subspecifically separable.

Papuina aff. *caerulescens* (Angas, 1869).

FLW 35, FLM 42.

The two shells have the protractive striae of the *eddytonensis* complex, but the umbilicus is less open, the body whorl more rounded, and the columellar lip broader and flatter than in any described species. *P. caerulescens* appears to be the nearest relative, but the Florida shells have a broader basal lip, less deeply excavated peristome, less angulated periphery, and a different colour pattern. Too little material is available to warrant naming.

Papuina meta meta (Pfeiffer, 1856).

FLW 4, FLW 15, FLW 23.

The six specimens are nearest those figured by Pilsbry (1891: pl. 9, fig. 60).

Papuina meta acmella (Pfeiffer, 1860).

FLW 4, FLW 35.

Four specimens of this colour form were collected.

Papuina ambrosia (Angas, 1867).

FLW 4, FLW 12, FLW 13, FLW 14, FLW 24, FLW 26, FLW 30, FLW 35, FLW 42, FLW 52.

This species is widely distributed in the Central Solomons and was the commonest large snail found by Kuntz. I. Rensch (1934: 4-5) recognised a subspecies, *ramsdeni* Angas, from Choiseul and Florida Islands. The thirty-five adult shells found by Kuntz are much nearer the typical *ambrosia* than the large *ramsdeni* (see Table 2). Different

populations on Florida Island may have been sampled, or the shells seen by I. Rensch were simply the result of a favourable year.

Table 2.

Placostylus, *Chloritis*, and *Papuina*.

		<i>P. kreftii</i>	<i>C. quercina</i>	<i>P. ambrosia</i>
Height	Mean	53.6	21.3	21.9
	Range	48.2-64.0	19.0-24.4	18.0-26.3
Diameter	Mean	21.6	34.6	21.2
	Range	20.1-24.5	29.6-36.7	17.2-25.6
H/D ratio	Mean	2.50	0.62	1.04
	Range	2.26-2.85	0.567-0.651	0.92-1.27

Family Planorbidae.

Gyraulus (*Pygmanisus*) *corinna* (Gray, 1850).

ML 100.

Most of the specimens were relatively small (1.65 mm. in diameter with 2½ whorls). The largest individual (2.22 mm. in diameter with 3¼ whorls) was identical with typical Fijian specimens ("*singularis* Clessin") and smaller Tasmanian ("*scottianus* Johnston") and New Zealand ("*corinna* Gray") shells. The minute planorbid snails vary greatly under differing ecological conditions, and it is not impossible that the above names refer to only one widely distributed species. Rather than add to an overburdened taxonomy, I have utilized the oldest available name for the Solomon shells.

Family Helicinidae.

I. and B. Rensch (1936: 679-683), Dell (1955a, 1955c) and Clench (1958: 159-164) provide recent records for Solomon Island helicinids. The identity of the shell that Dell (1955c: 426) reported as *Geophorus agglutinans* (Sowerby) is puzzling. *Geophorus* is a Philippine-Indonesian genus, and *G. agglutinans* a common Philippine species. Its occurrence in the Solomons would be most unexpected. Possibly this record is based on specimens of *Pleuropoma sophiae* (Brazier), which was described from the Treasury Islands, and is somewhat similar to *G. agglutinans* in shape and colour.

Palaeohelicina egregium (Pfeiffer, 1855).

FLW 4, FLW 8, FLW 11, FLW 13, FLW 14, FLW 24, FLW 26, FLW 30, FLW 32, FLW 35.

There is considerable variation in the colour banding of this common species. All specimens had a single red spiral band just below the keel, which varied in width from one to two millimeters. Many had a lighter, wider band above the periphery midway between the keel and suture.

Typical *egregium* is known from the Florida group, Malaita, and Stirling Islands. I. and B. Rensch (1936: 679) and Clench (1958: 162)

report *P. moquiniana* (Recluz) from Tulagi, but all the Kuntz specimens from Tulagi (FLW 8, FLW 11) were *P. egregium*.

Sturanya modesta (Pfeiffer, 1853).

FLW 26, FLW 29, FLW 30, FLW 32, FLW 38.

The original locality of *S. modesta* was given as Tanna, New Hebrides. E. A. Smith (1885: 598-599) established the identity of the types with the Solomon Island species. No helicimid resembling *modesta* is found in the New Hebrides (Solem, 1959b: 178), and circumstantial evidence suggests that the locality is erroneous, the type localities of a New Hebridean *Pupina* and *S. modesta* having been switched in manuscript.

Solem (1959b: 168) accepted the type designation of H. B. Baker (1922: 43) for *Sturanya*, which led Pilsbry and Cooke (1934) to propose a substitute name, *Sturanyella*. H. B. Baker (personal letter) called my attention to an overlooked type designation by Kobelt in a review of Wagner's studies. The type of *Sturanya* Wagner, 1905 is *Helicina plicatilis* Mousson by subsequent designation of Kobelt (1905: 207). *Sturanyella* thus becomes an objective synonym of *Sturanya*.

Family Pupinidae.

Pupina (*Pupina*) *keradreni* Vignard, 1829.

FLW 16, FLW 21, FLW 30, FLW 33, FLW 40, FLW 44, FLW 46.

Clench (1949: 31-33 and 1958: 166) maintained that *P. solomonensis* and *P. keradreni* are distinct species. This was questioned by Dell (1955c: 424), and Kuntz's collections do not support the separation. The two differ primarily in size, *P. keradreni* being 6.5-6.6 mm. high, and *P. solomonensis* 7.3-7.4 mm. high. Kuntz's twenty-five adult shells ranged from 6.1-7.5 mm. Twelve specimens were 6.8-7.0 mm. high, and one lot, FLW 44, contained shells 6.2, 6.4, 6.6, 6.7, 6.8, 6.9, 7.1, and 7.5 mm. high. The Florida and Tulagi populations are thus intermediate between *keradreni* and *solomonensis*. In the MCZ collection, typical *keradreni* is present from Ysabel, Rennell, Malaita and San Cristoval; typical *solomonensis* from Shortland and Choiseul; and intermediate sized shells from Florida and Tulagi. The relationship of the named forms is thus uncertain, but the problem requires more data than is available.

Family Cyclophoridae.

Leptopoma (*Dermatocera*) *perlucidum* (Grateloup, 1840) (= *vitreum* Lesson, 1831, not Draparnaud, 1801, and *nitidum* Sowerby, 1843).

FLW 15, FLW 20, FLW 45.

Generally this species is referred to as *vitreum* or *nitidum*, but I follow Forcart (1952) in accepting *Cyclostoma perlucida* Grateloup, 1840 as the earliest name for this species which is available.

Family Diplommatinidae.

Prior to this study, five diplommatinids were known from the Solomons—*Diplommatina brazieri* and *D. wisemanni* (Cox, 1870) from San Cristoval, and *D. aerari*, *D. solomonensis* and *Palaina gardneri* (Dell, 1955c: 424-425) from Mono Island, Treasury Group. Cox's species are unfigured and too vaguely described for comparison with the others. *Palaina gardneri* and *Diplommatina solomonensis* are dextral, and only *D. aerari* could be confused with the species described below. It is

readily distinguished by being 3.91 mm. high and having a weak tooth on the columellar lip.

Kuntz collected three species from leaf mould in the area behind Halavo (FLW 18). Their generic reference is uncertain. By definition, *Palaina* has no columellar tooth and *Diplommatina* a strong tooth on the columellar lip. All three Florida Island shells have a columellar tooth deeply recessed within the aperture. Study of specimens in the UMMZ and CNHM revealed that *Palaina taeniolata* Quadras and Moellendorff from Guam, Mariana Islands has a similar recessed tooth. Probably this character has developed several times in the diplommatinid stock, and the Florida species are provisionally referred to *Palaina*.

The three species are easily separable. *Palaina floridensis* is minute (height 2.11 mm.), has a relatively strong recessed columellar tooth and a circular thickened peristome; *P. clappi* is small (height 2.52 mm.), has a moderately developed recessed columellar tooth and a subquad-rangular peristome closely appressed to the penultimate whorl; and *P. megamorpha* is large (height 4.51 mm.), has a weak recessed columellar tooth and an only slightly expanded peristome with a thin parietal callus.

Size variation in the three species is summarized in Table 3.

Table 3.

	<i>Palaina</i> .		
	<i>P. floridensis</i>	<i>P. clappi</i>	<i>P. megamorpha</i>
No. of specimens	17	4	1
Height of shell			
Mean	2.11 mm.	2.52 mm.	4.51 mm.
Range	1.96-2.26	2.48-2.59	
Diameter of shell			
Mean	1.24 mm.	1.64 mm.	2.32 mm.
Range	1.14-1.33	1.61-1.67	
H/D ratio			
Mean	1.70	1.54	1.95
Range	1.55-1.84	1.49-1.61	
Whorls			
Mean	5%	4%	6%
Range	5¼-5½	4¼-5	

Palaina floridensis sp. nov. (Plate 6, fig. 2).

Diagnosis: A minute *Palaina* with 4¼ whorls, a prominent columellar tooth deeply recessed within the aperture, a circular thickened peristome slightly elevated above the penultimate whorl and the body whorl over-riding three-fourths of the penultimate whorl.

Description: Shell minute (height 1.96-2.26 mm.), sinistral, ovate-cylindric. Colour light brown. Whorls 5¼ to 5½, sutures deeply impressed, later whorls tumescent. Body whorl slightly constricted behind, over-riding about three-fourths of the penultimate whorl. Apical whorls 1¼ with weak, slightly protractive radial ribs. Remaining whorls with prominent, regularly spaced protractive radial ribs and a few fine spiral lines between the ribs. Aperture circular, with broadly expanded circular peristome slightly free of penultimate whorl. Strong columellar tooth deeply recessed within aperture. Operculum without calcareous elements, large, deeply concave, with central nucleus.

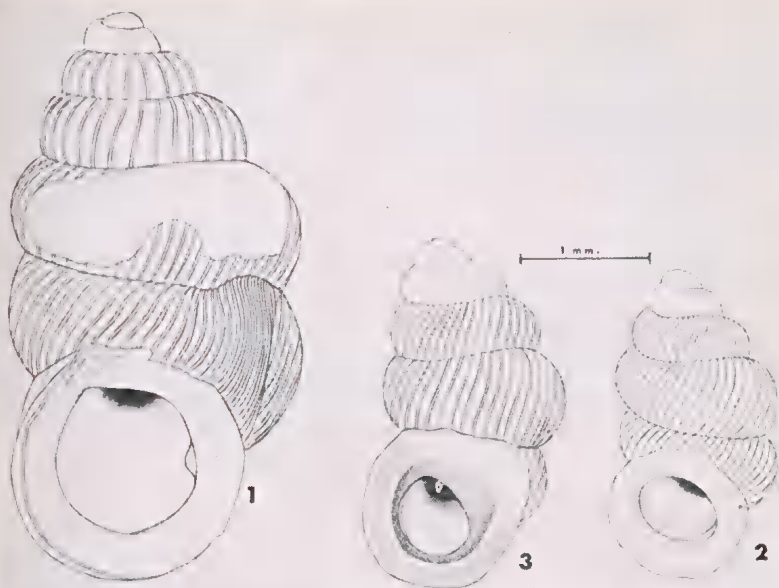


PLATE 6.

Fig. 1. *Palaina megamorpha*. sp. nov. Holotype.

Fig. 2. *Palaina floridensis*, sp. nov. Holotype.

Fig. 3. *Palaina clappi*. sp. nov. Holotype.

Type Locality: In leaf mould behind Halavo, Florida Island, Solomon Islands (FLW 18).

Types: The holotype is University of Michigan Museum of Zoology No. 181756. Paratypes are UMMZ 200494, CNHM 55208, and BPBM 212386.

Remarks: This was by far the commonest of the three species. Several individuals were collected alive and the operculum was "glued" to the aperture by the dry animal.

Palaina clappi sp. nov. (Plate 6, fig. 3).

Diagnosis: An average sized *Palaina* with 4½ to 5 whorls, a moderately developed recessed columellar tooth, a subquadrangular thickened peristome closely appressed to the penultimate whorl, and the body whorl over-riding the penultimate and one-third to one-half of the antepenultimate whorl.

Description: Shell of average size for the genus (2.5 mm. high), sinistral, ovate-cylindric. Colour very light brown or white. Whorls 4½ to 5, sutures deeply impressed, later whorls moderately swollen. Body whorl strongly contracted behind, over-riding penultimate whorls and one-third to one-half of the antepenultimate whorl. Apical whorls 1½,

with weak, slightly protractive radial ribs. Remaining whorls with stronger, almost regularly spaced, protractive radial ribs. Aperture circular, flaring, peristome subquadrangular, closely appressed to antepenultimate whorl at point of attachment. Aperture with moderately developed, deeply recessed columellar tooth. Operculum without calcareous elements, deeply concave, large, without central nucleus.

Type Locality: In leaf mould behind Halavo, Florida Island, Solomon Islands (FLW 18).

Types: The holotype is University of Michigan Museum of Zoology No. 181755. Paratypes are UMMZ 200495, CNHM 55207, and BPBM 212385.

Remarks: The strongly constricted body whorl and sharp ascension of the aperture on the spire recall some of the Bismarck Island *Palaina* (see I. Rensch, 1937), but size and whorl count easily separate *P. clappi*. This species is named after William F. Clapp, who published an important paper on the Solomon Island fauna (Clapp, 1923).

Palaina megamorpha sp. nov. (Plate 6, fig. 1).

Diagnosis: A large species of *Palaina* (4.51 mm. high) with 6½ whorls, a weak columellar tooth deeply recessed within the aperture, a very slightly expanded peristome, and the body whorl over-riding about one-half of the penultimate whorl.

Description: Shell large (4.51 mm. high), sinistral, subturritiform. Whorls 6½, sutures impressed, later whorls moderately swollen. Body whorl slightly constricted behind, over-riding to mid-point of penultimate whorl. Apical whorls 2, slightly elevated, worn. Remaining whorls with regularly spaced protractive ribs. Aperture circular, peristome only slightly expanded and thickened, reduced to a thin callus on parietal wall. Weak columellar tooth deeply recessed within aperture. Operculum not seen.

Type Locality: In leaf mould behind Halavo, Florida Island, Solomon Islands (FLW 18).

Type: The holotype is University of Michigan Museum of Zoology No. 200493.

Remarks: Possibly the only specimen seen is juvenile, and the apertural characters are greatly modified in adult shells. The size and whorl count separates this shell from any other Melanesian Diplommatinid and makes nomenclatural recognition advisable.

Family Truncatellidae.

Truncatella (*Taheitia*) aff. *scalariformis* Reeve, 1842.

FLW 32.

The single specimen is nearest to this form, but not identical.

Family Assimineidae.

Pseudocyclotus levis levis (Pfeiffer, 1855).

FLW 18, FLW 29, FLW 30, FLW 32, FLW 46.

All specimens were juvenile, about 2.5-3 mm. in height, but corresponded well in sculpture and operculum to adult shells in museums.

Omphalotropis (*Omphalotropis*) *nebulosa* Pease, 1872.

FLW 35, FLW 38, FLW 40, FLW 44.

Setaepoma mayri Clench, 1958.

Setaepoma mayri Clench, 1958, *Nat. Hist. Rennell Id.*, 2: 167-168, fig. 1, pl. 17, fig. 5 (Fulakora, Ysabel, Solomon Islands).

FLW 10.

Identification of the single juvenile specimen was confirmed by W. J. Clench. The genus *Setaepoma* (Clench, 1955) is based on *Japonia hedigeri* I. and B. Rensch (1936: 678-679, fig. 25) from Guadacanal. New Guinea species, for which Iredale (1941: 58) provided the generic names *Dominamaria*, *Memonella*, and *Atrocyclus*, are apparently closely related, as may be *Mychopoma exul* Moellendorff, 1897 from Constantin-haven and *M. pennatum* van Benthem Jutting (1958: 311-313, fig. 7) from Misool. All may belong to one generic unit, but more study is needed before any opinion can be given.

APPENDIX.

Collection stations of Robert E. Kuntz on Florida and Tulagi Islands.*

*Only those cited above or in Solem (1958).

ML 100. Small pool in Taro Swamp, 10-16 in. deep, 100 feet from mangroves. "MacFarlands Water Hole". January 11, 1945.

FLW 2. Swampy area near mangroves, Halavo, Florida Island. Sept. 26, 1944.

FLW 4. Around fallen trees and rocks, 300-500 feet elevation, Florida Island. October 1, 1944.

FLW 5. Rocks at edge of semi-permanent stream, south-west side of Tulagi. Sept. 15, 1944.

FLW 6. On rocks in swiftly flowing water near FLW 5. Same date and data.

FLW 8. Wet broad leaf vegetation in ravine, south-west Tulagi. Sept., 1944.

FLW 10. Behind Halavo, Florida Island.

FLW 11. Small stream south side of Tulagi. Sept., 1944.

FLW 12. Mangroves or shrubs in swamp behind Halavo, Florida Island.

FLW 13. On trees, shrubs and ground behind Halavo, Florida Island. Oct., 1944.

FLW 14. In leaves on hillside behind Halavo. Oct., 1944.

FLW 15. Ground debris, 200 feet elevation, one mile behind Halavo, Florida Island. Oct. 1, 1944.

FLW 16. Under British Residency, Tulagi. 250 feet elevation. Oct., 1944.

FLW 17. Freshwater stream in sago palm swamp, Turner City, Florida Island. Sept., 1944.

FLW 18. Leaf mould, 30 feet from stream bank, elevation 60 feet, one-half from sea behind Halavo, Florida Island. Oct. 22, 1944.

FLW 20. Under edge of hut at Halavo, Florida Island. Oct. 22, 1944.

- FLW 21. Same as FLW 18.
- FLW 23. From ground in low area one-quarter mile behind Halavo, Florida Island.
- FLW 24. On dead logs, decaying leaves, damp rocks in shade, three-quarters mile behind Halavo, Florida Island. Elevation 300 to 500 feet, thick jungle with south-east exposure. Oct. 1, 1944.
- FLW 26. On broad-leaf plants in jungle, Halavo, Florida Island. Oct. 22, 1944.
- FLW 28. Same as FLW 26, but during night.
- FLW 29. From shrubs and a dead tree trunk, one-half mile from beach at 100 feet elevation behind Halavo, Florida Islands. Oct. 23, 1944.
- FLW 30. Under forest debris near stream, one-half mile behind Halavo, Florida Island. Oct 22, 1944.
- FLW 32. Slopes of a small stream north of Halavo, Florida Island. Nov., 1944.
- FLW 33. Under dead leaves on "Radar Hill", 170 feet elevation, Florida Island. Nov., 1944.
- FLW 34. Pool 4-8 in. deep, 50 yds. from mangrove swamp near Hagalu, Florida Island.
- FLW 35. Ground debris in plantation, on vegetation one to four feet above ground, peninsula east of Halavo, Florida Island. Nov., 1944. Elevation three feet, 20-100 feet from beach.
- FLW 37. Same as FLW 34.
- FLW 38. Peninsula east of Halavo, Florida Island. Nov., 1944. Under debris.
- FLW 40. Soil samples from peninsula east of Halavo, Florida Island.
- FLW 42. On ground in heavy jungle near Hugutambu River, Florida Island. Jan., 1945.
- FLW 43. Under planks on "90 mm. Hill", Tulagi. In grassy, semi-open area.
- FLW 44. Rotten sago palm trunk, 8-10 in. down in wet debris, south-west Tulagi.
- FLW 45. On ginger leaves in deep shade, three feet above ground, Kokemtambu Island. Jan., 1945.
- FLW 46. Under side of leaves at Hagalu, Florida Island. Jan., 1945.
- FLW 47. On sand and logs along beach at low tide.
- FLW 48. In mud or on roots in mangrove swamp, west end of Tulagi. Dec., 1944.
- FLW 50. On mud flats or mangrove roots at low tide, Tulagi. Feb., 1945.
- FLW 51. On debris in water in mangrove swamp, Hagalu, Florida Island. Feb., 1945.
- FLW 52. Piles of fallen leaves and fronds in sago palm forest on Florida Island opposite west end of Tulagi. Jan., 1945.
- FLW 54. Food pile in Haleta Village, Florida Island. Feb., 1945.

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THE OCCURRENCE OF A NEMATODE PARASITE IN THE GENUS *STYLODON*

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Little is known concerning the presence of nematodes in molluscs, although molluscs have long been suspected of being intermediate hosts for nematodes parasitic in vertebrate animals such as sheep, cats and chickens. Previously, it has been the nematologists who were concerned with this problem, and the literature is found principally in the journals of parasitology. Chitwood (1937) and Mengert (1953) have summarized the present knowledge about the occurrence of nematodes in molluscs. Mengert reported that an examination of 1300 snails revealed 30 species of roundworms. This work was done in Germany on native material, mostly slugs. Chitwood and others have reported nematodes infesting several genera of molluscs including *Opeas*, *Helix*, *Polygyra*, *Anguispira*, *Succinea*, *Cepaea*, *Hygromia*, *Helicigona*, *Theba*, *Monacha*, and *Helicella* among the land snails, and *Lymnaea*, *Planorbis*, *Viviparus*, *Physa*, and *Bythinia* among freshwater snails. Nematodes may occur in molluscs accidentally, as parasites living their entire life cycle in the snail or as juveniles spending part of their life cycle there. It is this last group with which we are particularly concerned, for it contains species of economic importance.

Gerichter has done considerable experimental work on the life cycle of lung nematodes of sheep and cats, and has shown conclusively that at least five species of lung nematodes are dependent upon molluscs for their intermediate hosts.

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